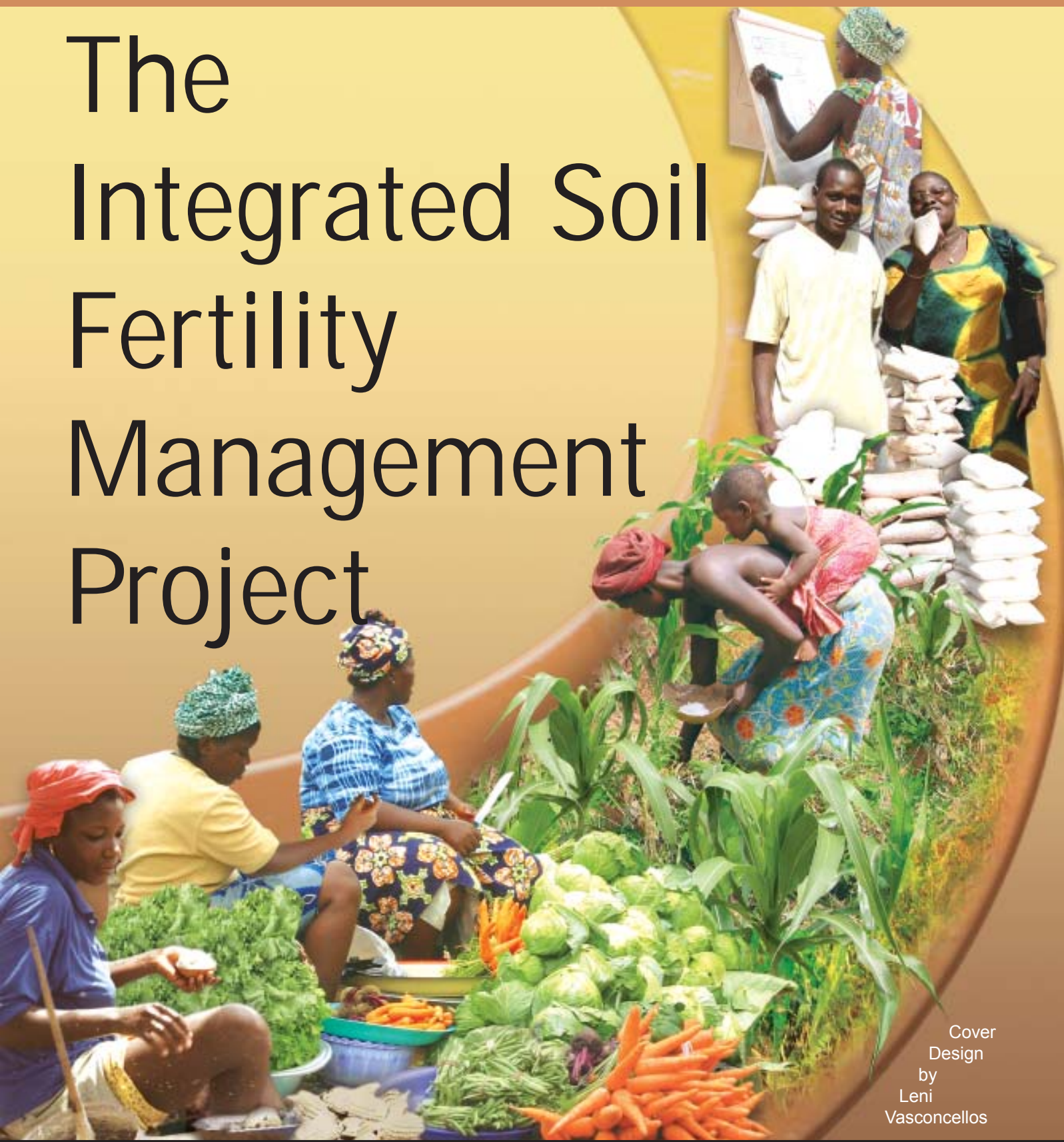


**Fertile Ground for Market Development**

# The Integrated Soil Fertility Management Project



Cover  
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## The Challenge

The eradication of extreme poverty and hunger is first on the list of development goals accepted by the United Nations Millennium Summit for 2015. Will Africa meet the deadline?

In line with this goal, the New Partnership for Africa's Development (NEPAD) targets an average annual increase of 6% in agricultural productivity to ensure food security and sustain national economies. In the case of sub-Saharan Africa, it is established that this increase must come through agricultural intensification. In fact, with increasing population pressure, the potential for extension of agricultural land is shrinking. At the same time, soil nutrient stocks are steadily declining because nutrient exports by crops are not compensated. This is due to the combination of continuous cropping, low external input use, and the impracticability of traditional practices such as fallowing. Sub-Saharan countries are grappling with a daunting challenge: produce more food for a fast-growing population on low-fertility soils.

## The Constraints

In most countries in sub-Saharan Africa, the quality of the resource base is inherently poor. The highly weathered soils have low content and poor quality of soil organic matter, low levels of nitrogen and phosphorus, and low water-retention capacity. As such, they are more susceptible to degradation under improper management. Under these conditions, intensification can take place only with increased use of mineral fertilizers and other external inputs including improved seeds, crop protection products, and appropriate farm implements.

However, high farm-gate prices often mean that external inputs are out of the farmers' reach. Their timely availability is also problematic due to market failures and poor transport infrastructure. Likewise, farmers do not have secured access to profitable markets for their produce, which limits their financial resources. Without effective credit systems, which generally are not available, they cannot afford to buy external inputs. Even when fertilizer can be used, the rate of return on investments is low due to the poor quality of the soil; this discourages farmers from investing in soil fertility.

## An Integrated Approach to Agricultural Intensification

To promote and sustain agricultural intensification processes, a holistic and dynamic approach is required that fosters both technical and institutional change. Therefore, the Integrated Soil Fertility Management (ISFM) project aims at increasing the productivity, profitability, and sustainability of agricultural production of small-scale farmers in West Africa through:

1. Fine-tuning and extension of ISFM technologies (the technological ground); and
2. Facilitating institutional change to improve farmers' access to input and output markets and credit structures (the institutional ground).

### ISFM Farmers Have a Choice

**Madja Koumboguidja and his wife Gbanyab live in the village of Matiga in the savanna region of northern Togo. Their achievements illustrate what ISFM and other accompanying measures can change in the farms and in the lives of farmers.**

**Madja's success story began in the early 1990s. The triggering factor was the purchase of a plow, and then a cart and a pair of oxen with credit provided by the national cotton company. With the new agricultural equipment, the Togolese farmer was able to increase the amount of compost that he could transport and use in his fields following advice from a local nongovernmental organization. A real change occurred 4 years ago when he started to combine compost and animal droppings with mineral fertilizers. Through the revolving fund implemented by the IFDC Africa Division and managed by a local farmers' organization, Madja obtained credit to buy mineral fertilizer. He says his yield then quadrupled.**

**Madja has developed sound soil improvement strategies including crop association, rotation, and diversification. For each type of soil, he adopted a different strategy based on the soil's aspects, history and climatic risks. He also learned to improve the quality and diversify the sources of organic resources by cultivating legume crops such as cowpea, pigeon pea and soybean. The strength of Madja's approach lies in the sequence and the integration of the different components. It progressively developed into a crop-livestock-agroforestry system, according to the evolution of his knowledge, equipment and financial resources. Every successful innovation provided the possibility of starting a new experiment, and each improvement is chosen to reinforce the existing farming system.**

***"After participating in the training course about compost making, I am ready to show other farmers how to prepare compost."***

**Haruna Alhassan, farmer in the Tamale region, Ghana**

## The Program Leaders' Perspective

The Integrated Soil Fertility Management (ISFM) project started about 5 years ago, with a few contacts in Togo, Benin and Niger and 2 years of experience with experimentation in farmers' fields. Funds in this difficult first period came from the International Fertilizer Industry Association (IFA) – still a strong supporter of the ISFM project. In those days, we didn't talk about the ISFM project. The IFA-funded project was called: Fertilizers and Sustainable Agricultural Development: Strengthening Linkages between Farmers, Fertilizer Dealers, Researchers, and Extension Workers. In fact, this was a visionary title, as we see more and more our real niche in facilitating agricultural intensification – based on ISFM to improve fertilizer-use efficiency – through networking and capacity-building activities. Today we work in 7 West African countries and in 16 pilot zones. Activities and approaches differ somewhat per zone; the specific setting and history, the range of local initiatives, and the capacities of the people and organizations with whom we work are considered. The approach to promote ISFM-based agricultural intensification is evolving, and we are working hard to adapt and refine our methods. In the coming years we will, for instance, need to strengthen our ability to identify novel high-value crops and post-harvest value-adding processes, based on a better insight in commodity chains and related industries.

We are proud to have found ways of dealing with a large heterogeneous group of partners with overlapping and sometimes even conflicting agendas. Many of our partners invest their own resources into the project. This enables us to use the relative small budgets that we have in a catalytic way—sponsoring activities that otherwise would not have been done. The role of collaborating farmers, traders, rural bankers and their organizations and networks are changing quickly from beneficiaries to partners.

*We are very grateful for the long-term support of the IFA, the United States Agency for International Development (USAID), the International Fund for Agricultural Development (IFAD), and the Netherlands' Ministry for Development Cooperation (DGIS) to this project. Although we would welcome more funds to scale-up our activities within the most dynamic sites, we also believe that for truly sustainable results the principal stakeholders themselves and their own resources are key. Our contribution is to provide and extend the opportunities for discussion, learning and networking, and – if needed – to give training and well-targeted assistance to improve the capacities of individuals and organizations to develop the market instead of waiting for it to happen."*

**Dr. Arno Maatman**  
Program Leader  
Input Accessibility Program

**Dr. Marco Wopereis**  
Program Leader  
Integrated Intensification Program

## The Technological Ground

Small-holder farmers in sub-Saharan Africa are strongly dependent on and constrained by soil fertility. The often unfavorable climate and low soil fertility create intense pressure on land even at relatively low population densities. This causes degradation of soils in large parts of sub-Saharan Africa. Soil fertility management is, therefore, key to improving agricultural productivity.

ISFM refers to making the best use of inherent soil nutrient stocks, locally available soil amendments (e.g., crop residues, compost, manure), and mineral fertilizers to increase productivity while maintaining or enhancing the agricultural resource base. Farmers, the IFDC Africa Division, and partners use a participatory learning and action research process to develop ISFM options that are sustainable and that improve farmers' livelihoods.

ISFM options focus on building soil nutrient capital, better management of available organic resources, and increased efficiency of mineral fertilizers. Increased water use efficiency is often an additional benefit of ISFM. With ISFM, mineral fertilizers play a double role: they increase crop yields and may contribute to improvement of the availability and quality of soil organic matter and, therefore, eventually their own efficiency. Organic resources are rarely substitutes for mineral fertilizers because they have low or rather inaccessible nutrient content and are usually

not abundantly available. They are, however, crucial soil conditions to boost mineral fertilizer efficiency. Such organic resources also act as environmental security devices. As they improve storage and recovery of nutrients, they reduce leaching and losses that are harmful to the environment and, therefore, decrease the risks related to the use of mineral fertilizers.

## The Institutional Ground

The approach developed by IFDC Africa Division is unique in combining the participatory development of ISFM technologies with coordinated efforts to experiment and extend alternative institutional arrangements. Capacity-building activities link farmers with inputs dealers, rural bankers, and traders and strengthen the innovative capacities of the various stakeholders involved.

The ISFM project has developed into a grassroots project that is designed to enhance the capacities of farmers and local entrepreneurs to anticipate and adapt to structural changes that characterize economic development in West Africa. In particular, the project encourages farmers to enter the market and small entrepreneurs to develop agribusiness enterprises that provide farmers with timely and good quality inputs. Primary emphasis is, therefore, placed on fostering dynamic and business-oriented farmer and trader organizations. These organizations play economic or advocacy roles, sustain networks of credit structures, and participate in platforms to negotiate land

use contracts or to solve specific problems related to market failures. Farmer organizations have been set up to facilitate farmers' access to seeds, mineral fertilizers, crop protection products and, in some cases, phosphate rock. They also build and manage storage facilities, which enable producers to act effectively on the supply-demand market. Women play an important role in these new initiatives. Finally, much attention is given to knowledge and communication systems and creative low-cost methods to improve information exchange.

Where farmers cannot afford to invest in their soils, a revolving fund is installed serving the double purpose of giving access to required capital and training farmers in the management of a credit structure. The revolving funds are set to become guarantee funds at rural banks.

### Our Record So Far

The outcomes of the different interventions at various levels are encouraging. Farmers who continue using ISFM technologies on the same plots are reaping the fruits of their efforts in the form of substantial yield increases and more responsive soils. Whereas average maize yields are about 1-2 tons/ha, average values for farmers' adaptive trials are between 2.5 and 5 tons/ha, depending on the zone, rainfall distribution, soils and management factors. Value: cost ratios for ISFM production are well above 2 and returns to labor far above the local salary scale. These achievements have created emulation among farmers. The learning plots are attracting more and more visitors, and the number of farmers who want to join the project continues to increase.

Today the ISFM project has been established in 16 well-targeted pilot areas in seven West African countries (Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria and Togo). The project has expanded its activities to 130 villages. More than 3,000 farmers are directly involved in "learning activities," through approximately 120 farmer organizations. There is ample reason to consider that each of these ISFM farmers attracts 5-10 other farmers who are eager to join and have already started experimenting with their own ISFM options.



The number of partner organizations has increased from 6 in 1998 to 27 in 2003. Extension of project activities to other sub-regions (and villages) is progressively taking place with matching funds from the partner institutions. Farmer organizations have established functional structures to provide their members with inputs, supply information about market prices, collaborate with rural banks, and build linkages with private entrepreneurs and government agents.

ISFM has given significant and convincing results with a range of crops under different agro-ecological and socio-economic conditions. These crops include, for example, maize, millet and sorghum in the Sahel to humid Savannah; cotton in southern Mali; and irrigated rice in the Zio Valley in Togo, the Gaya Region in southern Niger, and the Kou Valley in Burkina Faso.

In southern Burkina Faso, the intensive maize cultivation sys-

### ISFM Improvement of Crop Yield and Fertilizer Profitability in West Africa

	Farmer's Practice		After 4 Years of ISFM	
	Cereal Yield	VCR Fertilizer <sup>a</sup>	Cereal Yield	VCR Fertilizer <sup>a</sup>
	(kg/ha)		(kg/ha)	
Maize: bush field	750	— <sup>b</sup>	2,750	4
Maize: compound field	3,000	— <sup>b</sup>	4,600	12
Sorghum	1,000	— <sup>b</sup>	1,800	8
Cotton	1,150	5	2,000	8
Irrigated rice	3,000	8	5,500	12

a. Value incremental yield/fertilizer cost.  
b. No fertilizer use by farmers.

tem, which had disappeared in this region because of degrading soils, is spreading rapidly. Soybean cultivation is expanding in northern Nigeria and southern Togo and is diversifying existing cropping systems. Cowpea is highly productive in southern Mali; it improves soils and nutritional levels and provides additional fodder to keep healthy stocks of animals. The ISFM project has increased its activities in the cotton zones of southern Mali, thanks to the considerable progress made by Malian partner institutions. In the Gaya Region, ISFM farmer groups continue to increase, and revolving funds are being consolidated to sustain investments in soil fertility.

All of these farmers have seen the positive impact of ISFM and agricultural intensification on their income and living conditions. They have also improved their capacities to enter and act on the market and to respond to new challenges.

## Feasible Pathways for Sustainable Agricultural Intensification

### The Approach

The approach comprises three slightly overlapping stages: (1) an exploratory stage, (2) an experimentation and extension stage, and (3) a scaling-up and -out stage.

Core activities are planned and carried out at different spatial and temporal scales. Two iterative and partly overlapping participatory cycles are executed according to

## A Participatory Process Approach



**Figure 1. The Three Stages of the Project**

*"For a long time the problem of low soil fertility has been perceived by small-scale farmers as fate. Experimentation with technological ISFM options has changed their ideas. More and more, farmers are investing financial means and using their experiences to improve and adapt strategies that better their livelihoods."*

Sido Agbelessessi,  
coordinator NGO CREMA  
in Togo



**"For decades in national and international arenas, development theories and policies have been inspired by the idea that technology is central to agricultural development. Enormous efforts have been made to change farmers' practices and to demonstrate new techniques and tools without proper consideration of the institutional environment. Indeed, the principal constraint to agricultural development and, in particular, a market-oriented agriculture lies well beyond the individual farmer, his knowledge, and his tools. The challenge is to find realistic pathways for action and to recognize the heterogeneity of institutions and the diversity and conflicting agendas of the social actors involved—pathways that build on the legacy of yesterday and the institutions that enable markets to function."**

Dr. Amit Roy  
IFDC President and  
Chief Executive Officer

the established goals and expected results. Each cycle consists of a phase called DATE: Diagnostic (D), Action planning (A), Trying out (T), and Evaluation (E). The first DATE cycle is conducted at the field-to-village level and focuses mainly on participatory learning and action research. The second DATE cycle is a participatory learning and action phase with emphasis on the extension and adaptation of successful technologies developed during the research DATE. It involves support to institutional changes that reinforce linkages between farmers, bankers, inputs dealers, and traders. The second DATE cycle is conducted at the village to district/region level.

port, there is every chance that ISFM and agricultural intensification in general will become remunerative enough to become adopted.

### A Team of “Change Agents”

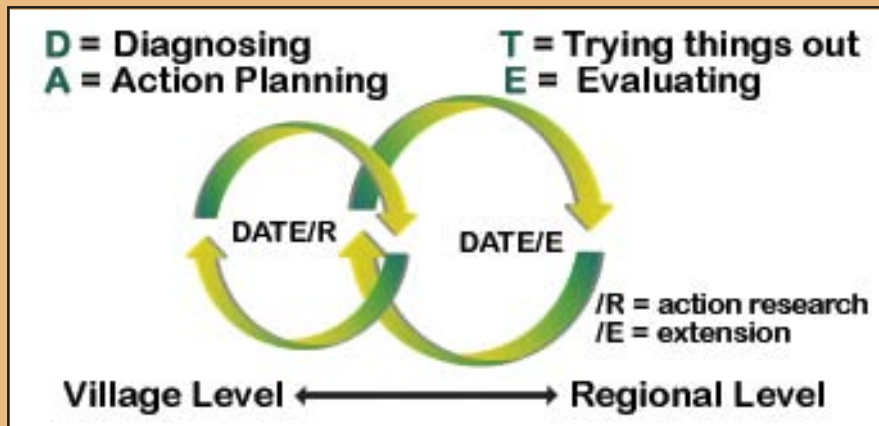
The change process is stimulated and supported by a team of “change agents.” This team consists of development practitioners and researchers from the IFDC Africa Division and partner institutions from the public and the private sector. They lead, accompany, or follow activities according to the phase, the evolution of the process, and the degree of ownership by farmers.

### The Gender Issue

The ISFM project aims at creating gender awareness so that the important role of women can be acknowledged and their initiatives supported within the household and the community. Women are actively involved in ISFM activities and participate in decision making.

### Participatory Approaches

Stakeholders and “change agents” determine entry points and starting blocks for agricultural intensification. This may involve certain ISFM options or improving access to factor or product markets. Learning and decision-making support tools are identified and developed according to the means, resources, preferences and constraints of each stakeholder, e.g., farmers or local inputs dealers.



**Figure 2. Research and Extension DATE-Cycles**

*“I participated in an ISFM village exchange day in 2001 and heard about the zai technology that restores heavily degraded soils. I proposed to the other women in my farmer group that we could do the same and that we should try to beat the neighboring villages with respect to the surface cultivated. We made a good start this year because the yield on our ISFM field is the highest in the region.”*

**Hadiza Ibrahim, female farmer from Guidan Gaba, Niger**

## ISFM Prominent Features

***Focusing on developing solutions to site-specific problems making the best use of local knowledge, experience, resources, and market opportunities.***

### Strategic Site Selection

For sustainable impact, it is crucial to select not only sites but also production systems and partners that can concur on the feasibility of ISFM to trigger agricultural intensification based on more viable and remunerative production systems. Experience has shown that intensification generally takes place when a number of basic conditions are met. These include (1) good agricultural conditions; (2) proximity of important markets; (3) relatively good infrastructure; and (4) favorable policies. The ISFM project focuses on production systems that are intensive and market-oriented. That does not mean favoring only sites that have the best economic potential or targeting the richest farmers. The purpose is to find situations where inputs can be made available and accessible to more crops, more farmers, and more fragile soils. Without government and donor sup-

## ISFM Women Farmers Have a Voice

Gbanyab Koumboguidja, Madja’s wife, is also involved in the change process facilitated by the ISFM project. Like her husband, she has access to credit and knowledge through a local farmer organization and is eager to try new technology. She started cultivating one of her parents’ fields. With the good harvest that she brought home, she managed to convince her husband to let her cultivate one of his own fields. From that time Gbanyab has had a say in farm-related matters, and her voice counts in making decisions within the household. For example, the couple decided to build stables for their oxen, an idea Gbanyab gained from a study tour to Burkina Faso, organized by IFDC Africa Division.

**These innovations have enabled the couple to feed their family better, buy more equipment, improve their clothing and animals, and send their five children to school. Above all, they can make plans for the future.**

## Stakeholder Platforms

Sustainable agricultural development requires commitments and investments from not only farmers but also the private sector and the public sector. This implies building trust and strengthening linkages. The IFDC Africa Division organizes and reinforces stakeholder platforms to facilitate dialogue exchange and cooperation among farmer groups, inputs dealers, policymakers and “change agents.”

## A Mutual Learning Process

The participatory development approach entails a continuous process of mutual learning among all stakeholders. Through this process, which brings together indigenous knowledge and scientific expertise, farmers can enhance their analytical and decision-making capacities.

## An ISFM Network: [www.aissa.org](http://www.aissa.org)

Motivated farmers, cooperating with the IFDC Africa Division and partner institutions, are promoting sustainable agricultural intensification through projects in West Africa. In early 2003, this partnership was formalized by creating a regional network called *Agricultural Intensification in Sub-Saharan Africa (AISSA)* to build bridges along the production chain and to strengthen linkages among farmers, inputs dealers, rural bankers, traders, and policymakers. The network covers 7 countries and involves more than 30 nongovernmental organizations. The AISSA network provides a platform for public and private organizations involved in facilitating sustainable agricultural intensification processes, exchanging information, planning collaborative activities, and joining forces for advocacy work.

**“Thanks to the ISFM technology that I use on my field, my family has enough to eat all year. With the surplus I was able to pay off my loan and save some money at the bank. After saving for 2 years, I had enough money to buy a new 0.5-ha field that cost me US \$ 675 and to repair my motorbike.”**

**Dahoue Tolèdé, farmer from Alodougnon, Benin**

**“I cultivated maize and cowpea by using ISFM technology. Besides producing food for the whole year, I was able to rent another field for 3 years and buy clothes and jewelry for special occasions for both my daughter and me.”**

**Alice Houetognon, female farmer from Alodougnon, Benin**

**“Farmers’ access to timely and quality inputs at affordable prices determines the feasibility of ISFM options whereas the availability of profitable food markets determines the willingness of farmers to adapt more intensive technologies. Therefore, the action at the local level is not enough but needs to be pressed forward by public investments in the development of markets for agricultural inputs and outputs at the national level. These efforts will even be more effective and more sustainable within regional frameworks. It is incumbent on governments to invest in roads and other infrastructure to reduce transport costs, secure economies of scale in fertilizer procurement, and encourage private entrepreneurs to invest in input distribution, especially in remote areas. An enabling policy environment will also foster the development of food processing enterprises, opening new local markets for agricultural produce.”**

**Dr. Henk Breman  
Director, IFDC Africa Division**

**“In Niger some of the changes that occurred in the area where the ISFM project is being implemented are the following:**

- **Farmers became aware of the importance of fertilizer in crop production, and now they do not grow crops without fertilizers and sometimes in combination with organic manure;**
- **All project villages have a farmers’ organization and farmers believe that they have to show that they are willing to work for themselves before receiving any help;**
- **Degraded land has been transformed into arable land. These degraded lands were at times used as soccer fields by people. Yields on the lands regained using the “zai” technique are sometimes better than on existing farmers’ fields;**
- **The farmer-to-farmer visits and study tours provided by the project have had a big impact on farmers’ day-to-day life. They have learned what is going on outside their region and are eager to try their newly gained knowledge in their own environment.**
- **Farmer organizations are ready to carefully select their new members in order to make their organization work the way it should and defend what they have established. “**

**Dr. Issaka Mahaman, Director General of the  
National Institute of Agronomic Research in Niger (INRAN)  
and coordinator of the ISFM project in Niger**



**“I learned about ISFM through my wife’s farmer group. I am now conducting experiments on an ISFM option with a cover crop (mucuna) and already produced many seeds to sell. I also bought 20 bags of mineral fertilizer in Vogan.”**

**Houndadika Amétoko, farmer from Atsansi Todomé, Togo**

# IFDC on the Africa Scene

## Our Mission

IFDC's mission in sub-Saharan Africa is to support the countries of the region in their efforts to increase agricultural production and farmers' revenues and improve the natural resource base at the same time.

IFDC is committed to creating the conditions for farmers to make sustainable choices that provide for the needs of present and future generations. The focus is on the empowerment of farmers and other primary stakeholders through improved access to inputs, markets, knowledge, information, technology, and policy tools. IFDC, therefore, is contributing to the achievement of two development goals accepted by the United Nations Millennium Summit for 2015 (Goal 1: Eradicate extreme poverty and hunger; Goal 7: Ensure environmental sustainability).

## Our Strategy

Our strategy is built around an integrated approach that consists of:

- Combining mineral fertilizer and soil amendments to increase fertilizer efficiency, reduce nutrient leaching and losses, and limit environmental risks.
- Linking soil fertility management to the development of input and output markets.
- Empowering and strengthening linkages between three main stakeholders: farmer organizations, the public sector, and the private sector.

## Our Programs

We carry out three interlinked programs:

### Integrated Intensification Program (IIP)

The program develops integrated soil fertility management options (ISFM) and learning and decision support tools to disseminate such options to support sustainable agricultural intensification. A key element of the ISFM technologies is the emphasis on the integrated use of mineral fertilizers and organic resources to enhance the efficiency of fertilizers, improve soil organic matter status and reduce risks to the environment. This program focuses on areas with relatively high population density and pressure on land resources. Strategic research, participatory learning and action research, and capacity building encourage the building of bridges between indigenous knowledge and scientific expertise.

### Input Accessibility Program (IAP)

The program supports the development of integrated soil fertility management strategies at the regional level. The focus is on the adoption process and the participatory development of technological options with measures that facilitate institutional change and improve linkages between small holders and input and output markets. Preference is given to regions with comparative advantages for intensive food and/or livestock production. The intervention strategy includes the involvement of women farmers at all levels of project design and implementation.

### Policy and Market Program (PPM)

The program promotes the development of favorable socioeconomic and policy environments to support soil fertility improvement. Activities cover policy and socioeconomic issues that directly or indirectly influence incentives to invest in soil fertility and agricultural input market development. The policy aspects cover general policy orientations of individual countries or sub-regional groupings. The strategy is articulated around a fertile triangle composed of farmers' organizations, the public sector, and the private sector.

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